



# Town of Eastham, MA

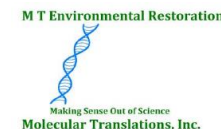
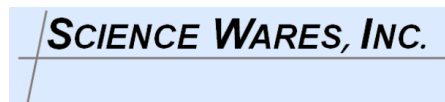
## Update on Wastewater Management Planning and Related Investigations

January 2019

**Jane Crowley** | Town of Eastham

**Jessica Janney and J. Jefferson Gregg** | GHD

**Doug Heely** | ES&M



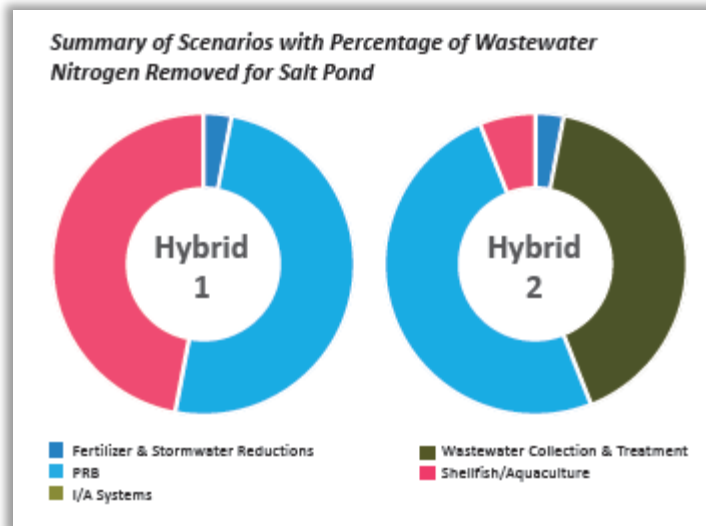
# Presentation outline

- Public Outreach Newsletter
- Nauset Harbor Embayment
- Salt Pond Wastewater Management Scenarios
- Budget Funding – Previous, Current and Future
- Watershed Planning
- Shellfish Update
- Permeable Reactive Barrier / Groundwater Discussion for Salt Pond



# Public Outreach Newsletter

- Planning Efforts
- 208 Plan Update Terms Glossary
- Future Planning
- Discussion of Next Steps
- Future Projects
- Town Contact



**Wastewater Management Planning Project**  
**NEWSLETTER**

**Eastham Moves Forward with Wastewater Planning**

The Town of Eastham is continuing with its wastewater planning to address the need to protect public health and the environment. The installation of the public water system is underway to address our most pressing public health need, and we are focusing on freshwater pond treatments in the initial effort to address one area of the environmental need. We are working with the Cape Cod Commission as it updates the Cape Cod Area Wide Water Quality Management Plan, often referred to as the 208 Plan, and we are now designated as a Waste Management Agency (WMA). As a WMA, we are responsible for developing and implementing a plan to address nitrogen in our groundwater to improve water quality in our estuaries. The estuaries currently showing the impacts of nitrogen that Eastham is "responsible" for include Salt Pond, Town Cove, and Rock Harbor. As a result of the availability of new nitrogen loading information developed as part of the Massachusetts Estuaries Program (MEP), we are now expanding the environmental focus and developing some hybrid solutions to wastewater management. Our current focus in the areas of Town Cove and Salt Pond.

Wastewater Management Planning Project | 1



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# Nauset Harbor Embayment

## Salt Pond:

- 100% WW Removal
- Eastham is 100% responsible for load

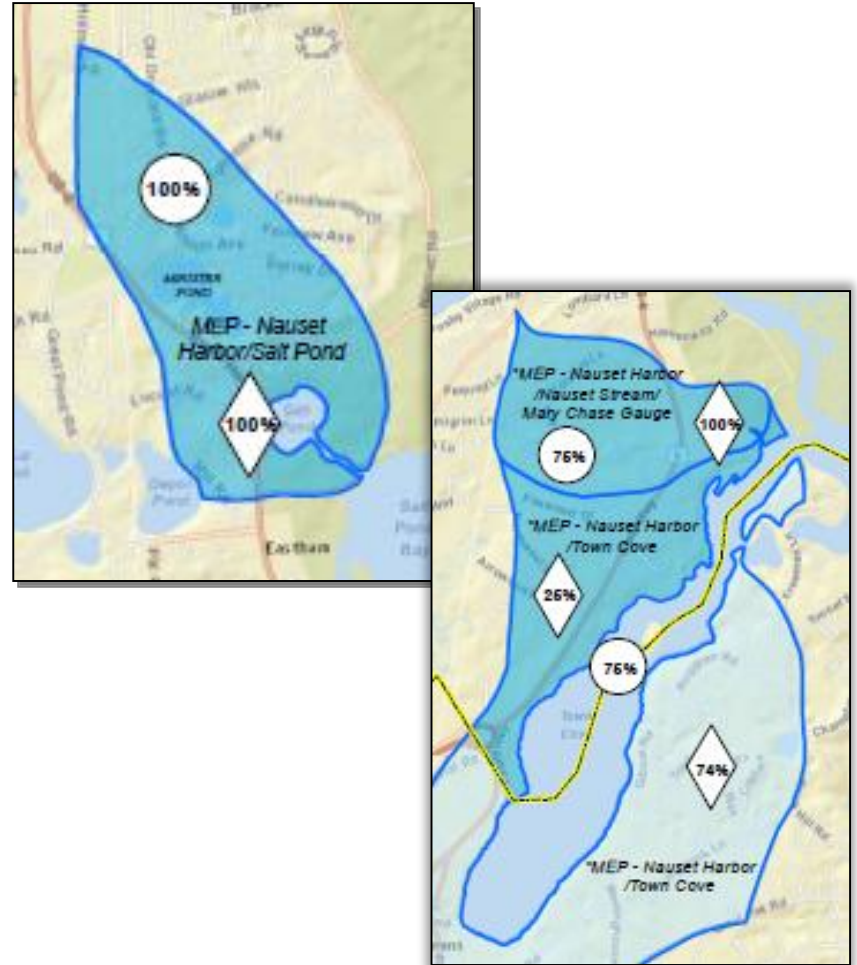
## Town Cove:

- 75% WW Removal
- Eastham is 25%\* responsible for load
- Orleans is 74%\* responsible for load & Brewster is 1%\*

## Nauset Stream / Mary Chase Gauge:

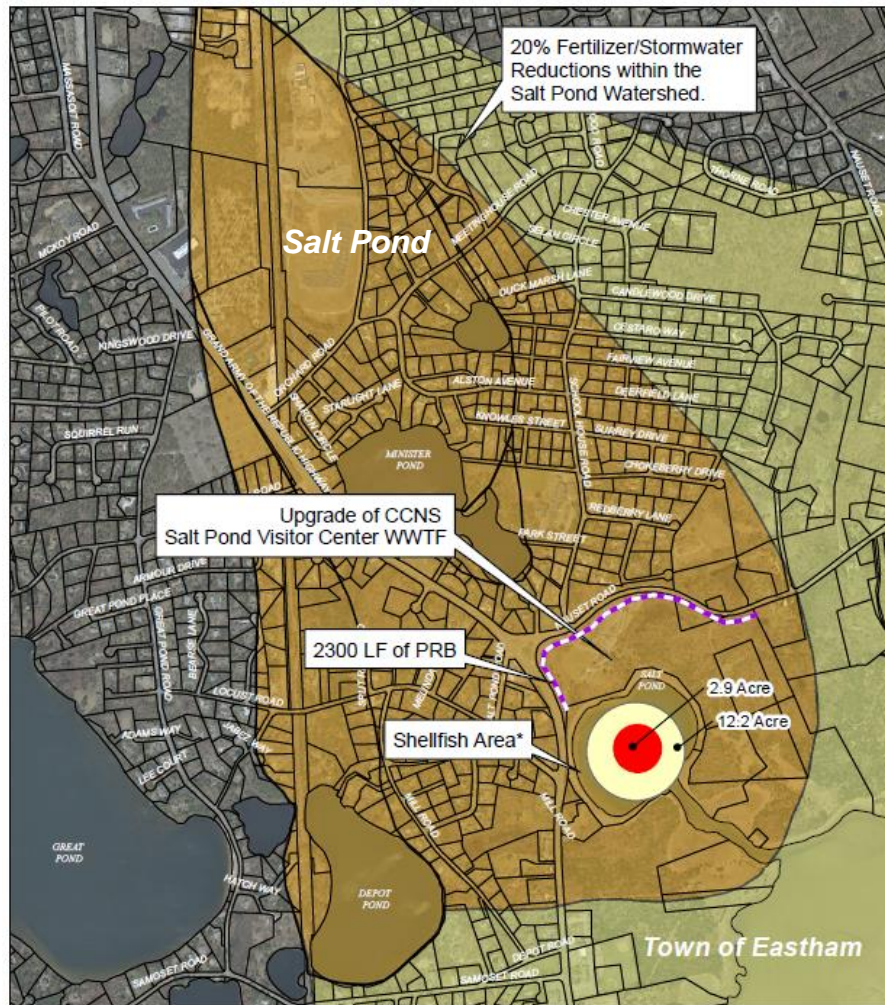
- 75% WW Removal
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*\* per the Cape Cod Commission*

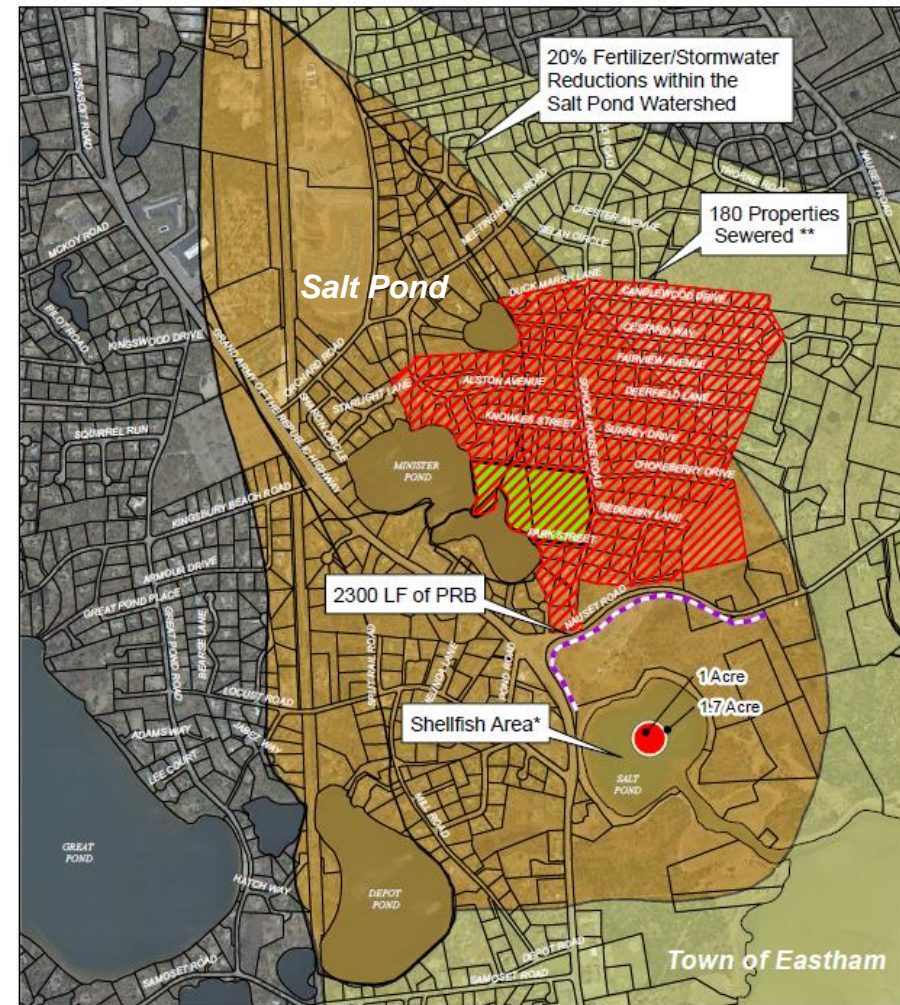




# Salt Pond – Hybrid 1 & 2



**HYBRID 1**



**HYBRID 2**

# Salt Pond – Tech Memo No. 3

## Summary of Hybrid Scenarios – Key Components:

Technology	Hybrid Scenarios	
	Hybrid 1 Evaluation	Hybrid 2 Evaluation
Fertilizer and Stormwater Reductions	Town Fertilizer Bylaw - 20% <sup>(1)</sup>	
Permeable Reactive Barrier	Well Data Collection and Analysis / Detailed Investigation / PRB Pilot	
Shellfish/Aquaculture	Shellfish Feasibility/Pilot Study	
Enhanced I/A Systems	CCNS on-site treatment upgrade	--
Wastewater Collection and Treatment	--	Implementation if improvements above are not effective – adaptive management approach
Note: (1) Represents a 20% credit of the total Stormwater / Fertilizer load only.		



# Watershed Planning

**Salt Pond**

Shellfish Pilot Study

Upgrade of CCNS Treatment System

Stormwater Improvements Schoolhouse/Ministers Pond

PRB Design & Pilot

**Collaborative Efforts and Hybrid Implementation**

Targeted Watershed Management Plan "Core Sewer Area"

Watershed Permit

Regional Approach Discussions with Orleans

**Town Cove  
Rock Harbor**

Flow Neutral Policy Development

0% SRF Financing

**TMDL Compliance**





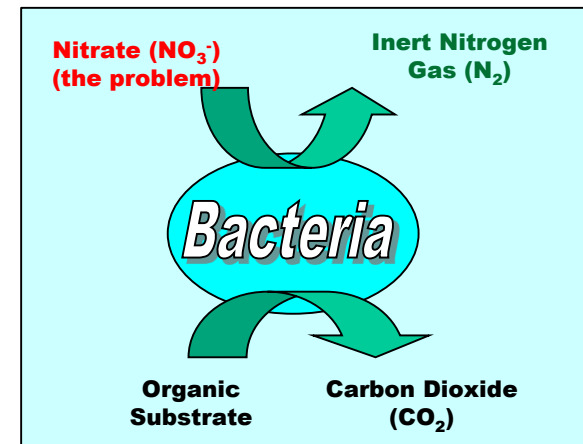
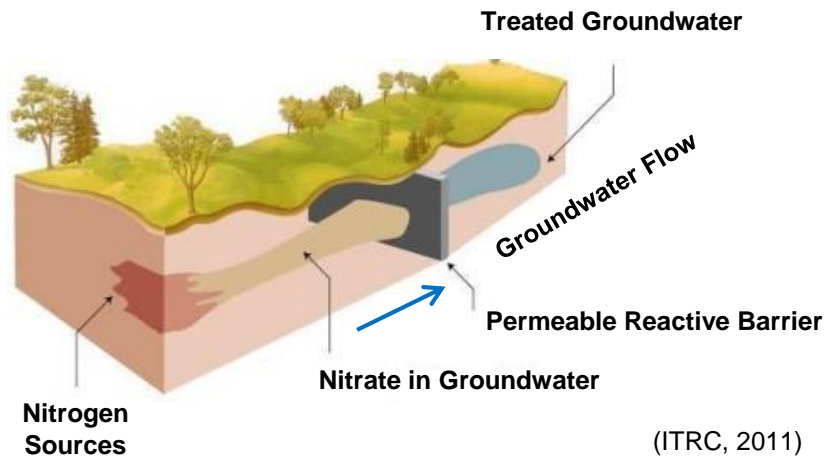
# Shellfish Update

- Shellfish Feasibility Study Completed
- Site visit to Lonnie's Pond with Natural Resources and CCNS
- Mock-up of floating bags on Salt Pond
- Next step is to develop a Shellfish Pilot Project Plan, approval on approach
  - Discussion with Stakeholders
  - Regulatory Agencies



# Permeable Reactive Barrier (PRB) - Subsurface Groundwater Treatment

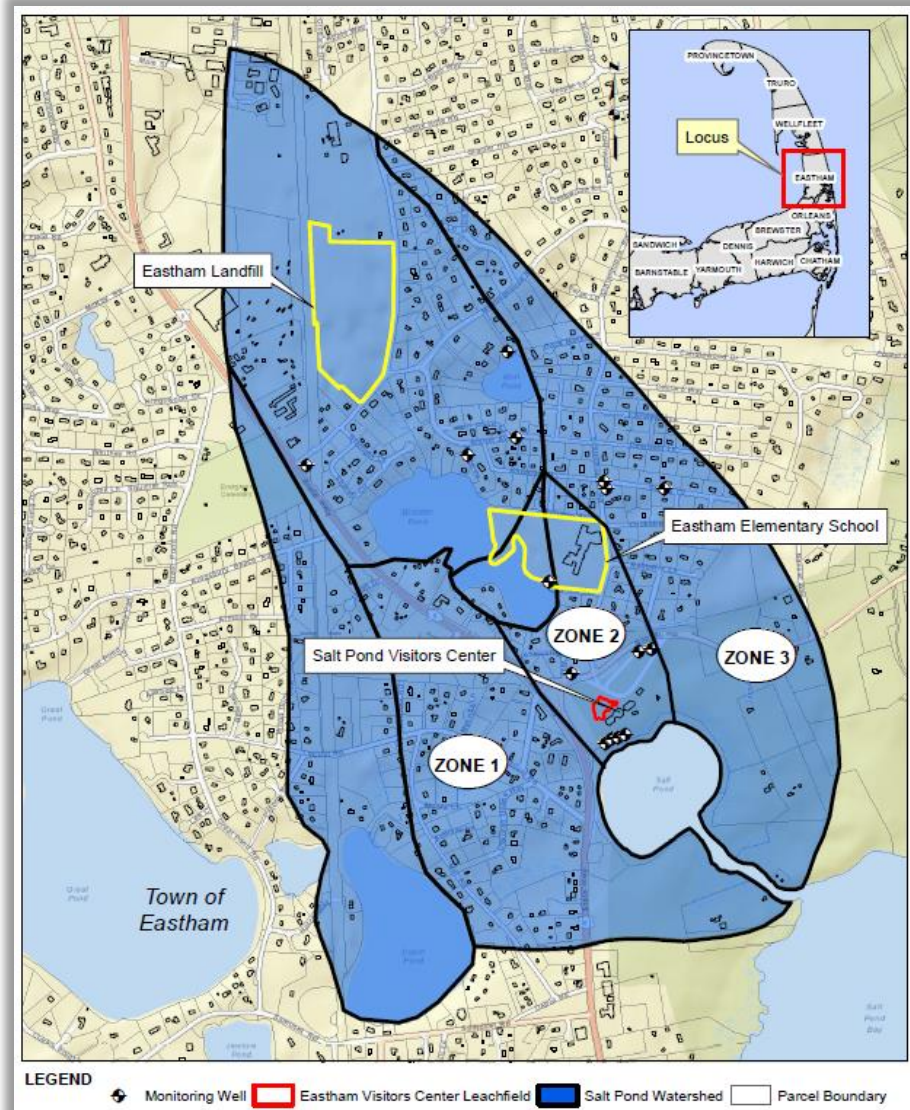
Reactive Material Installed in the Path of a Plume (e.g. nitrate)



Naturally-occurring Bacteria to Convert Nitrate to Inert Nitrogen Gas ( $\text{N}_2$ )  
Requires Anoxic (Low Oxygen Conditions)

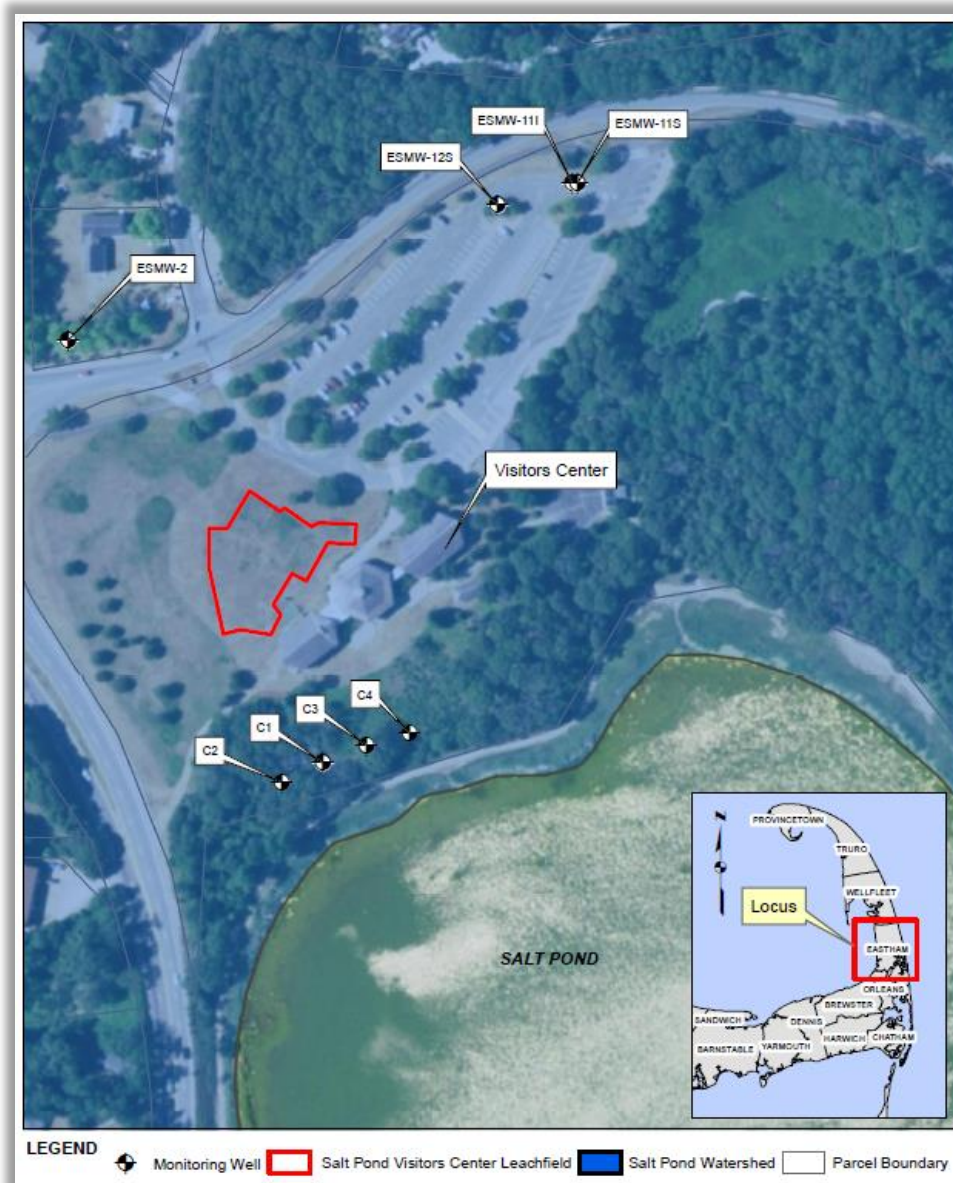
# PRB - Project Purpose and Background

- Characterization of groundwater flow and hydrogeology for Salt Pond
- Pilot PRB based on feasible conditions (site conditions, groundwater conditions, nitrate levels) – i.e. “sweet spot”





# Monitoring Well Locations – Salt Pond Visitor Center Area



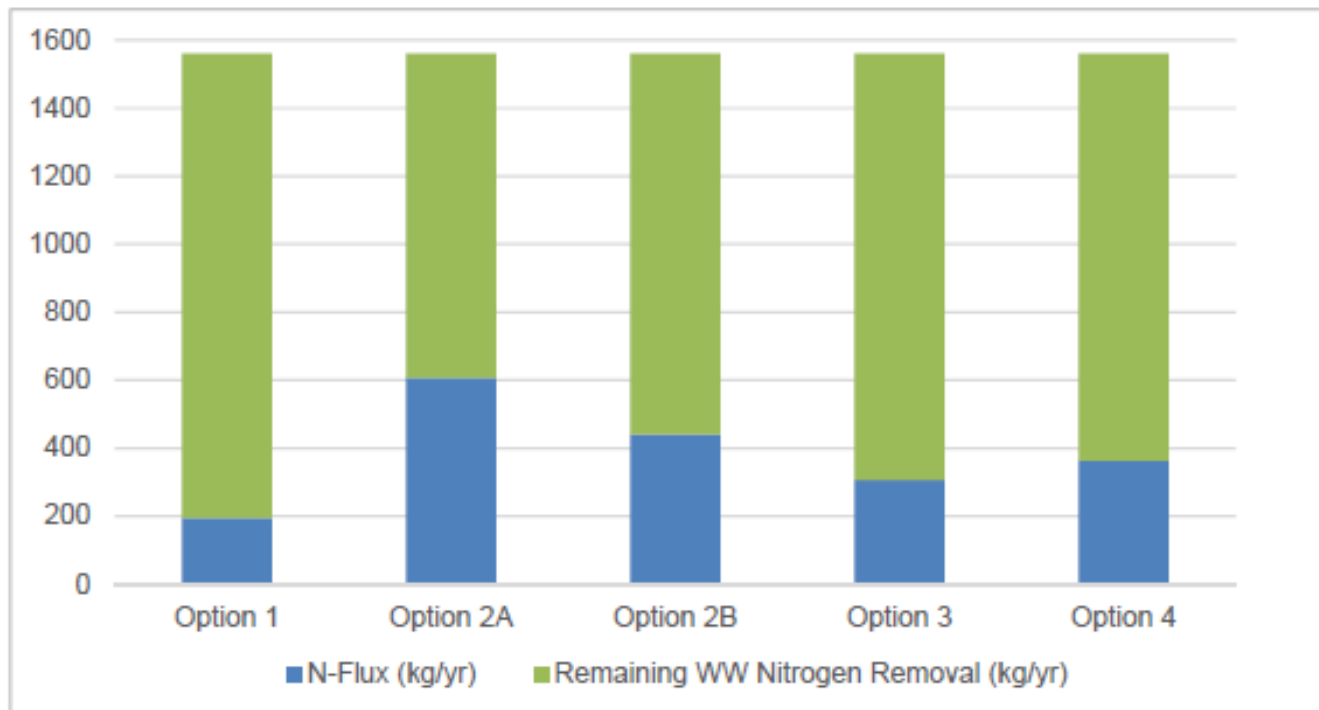
# Identification of Potential Demonstration PRB Locations



## Next Steps – Demonstration Site Investigation and Selection

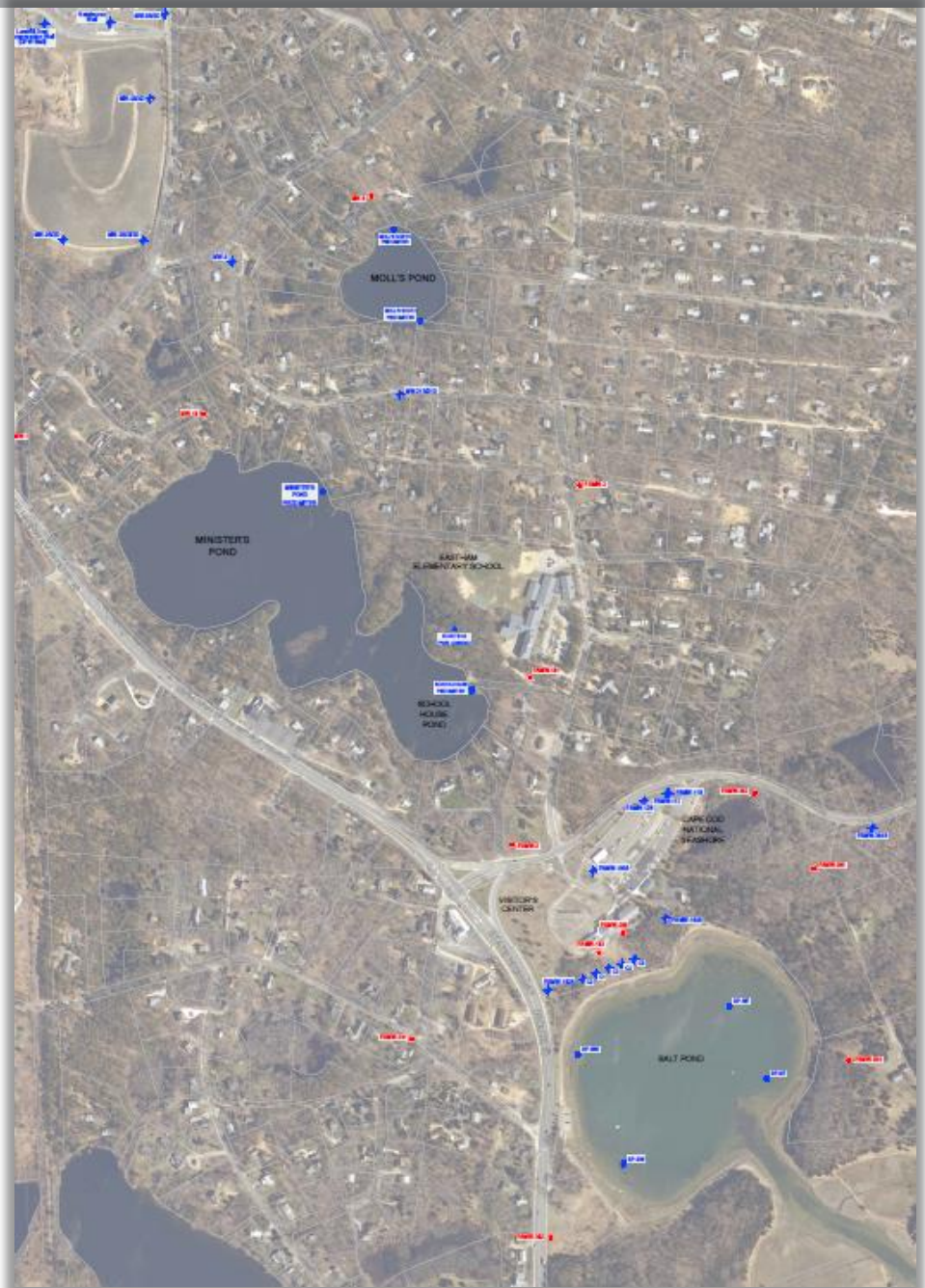
- Stakeholder Involvement – prioritize demonstration(s) site options
- Evaluation of data from hydrogeological investigations, development of pilot program for PRB, and sizing/siting of suitable demonstration location
- Identification of additional data needs

**Table 4** Estimated Nitrogen Removal by PRB Demonstration Option



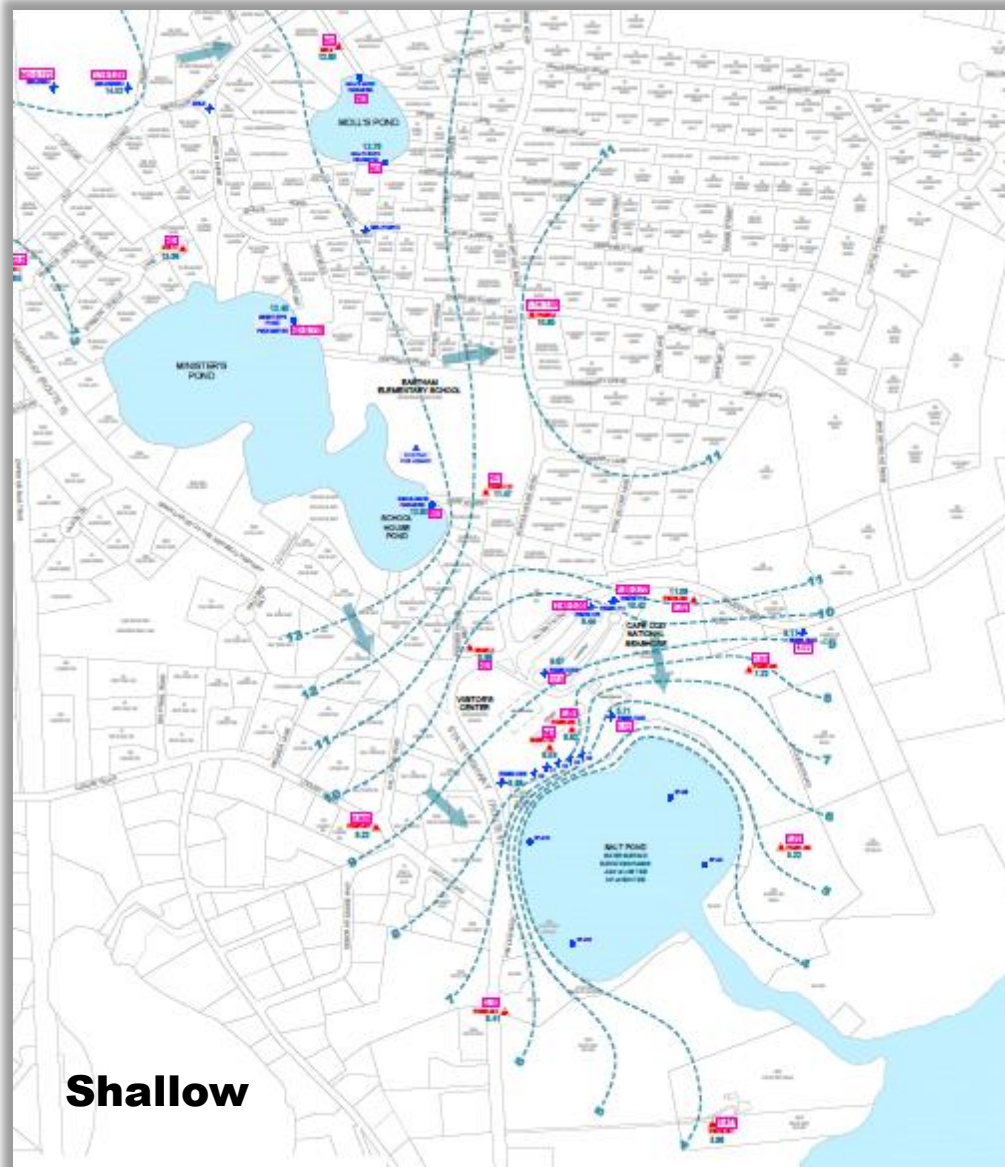


# Findings of Hydrogeological Evaluations for PRB Siting



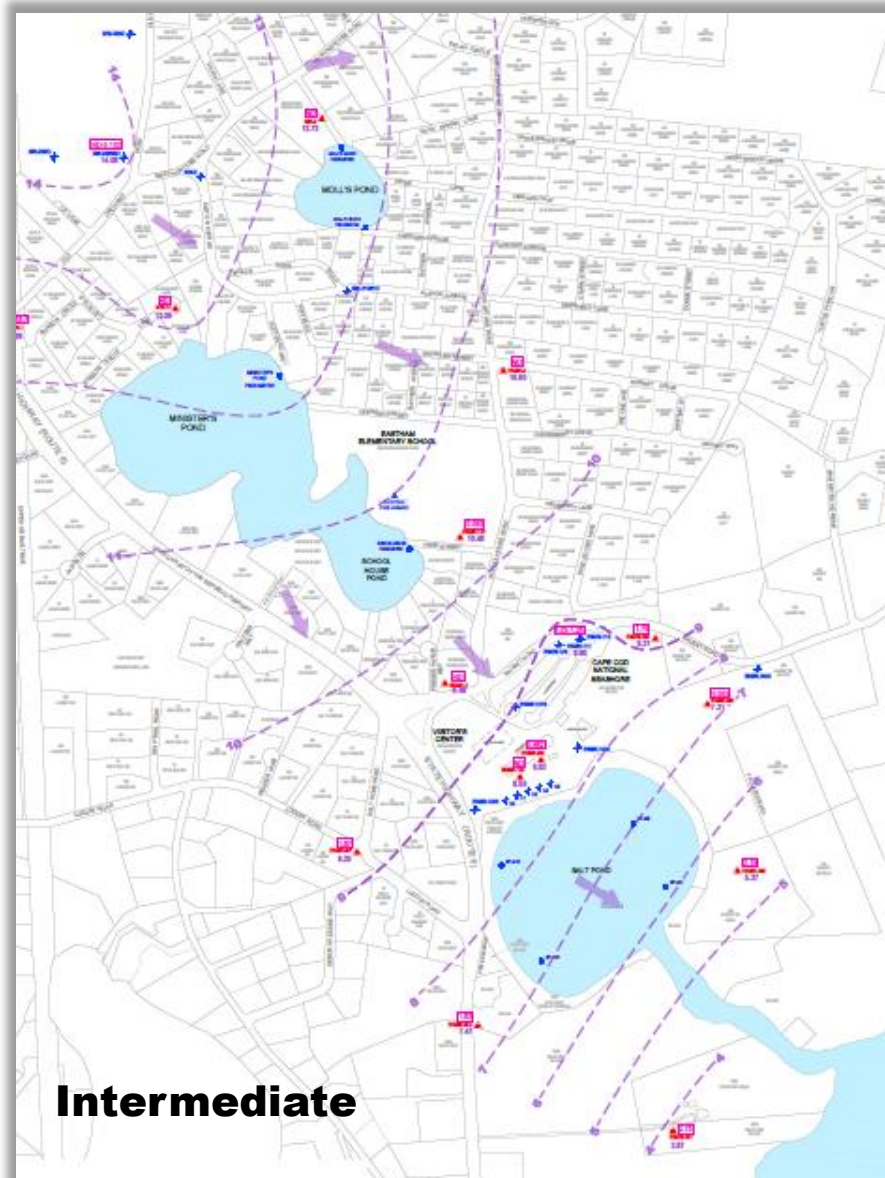
**Town of Eastham** Update on Wastewater Planning and Related Investigations

# Findings of Hydrogeological Evaluations for PRB Siting



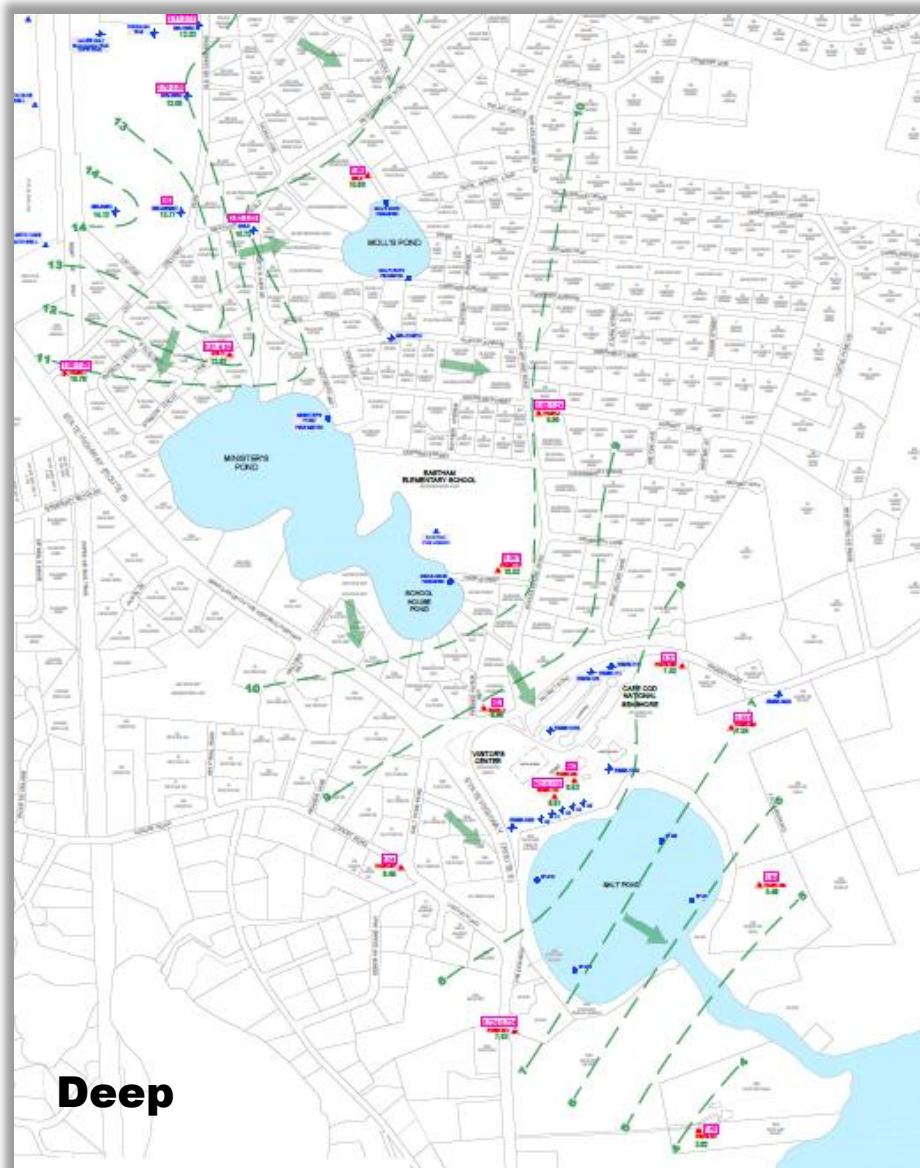
Shallow

# Findings of Hydrogeological Evaluations for PRB Siting





# Findings of Hydrogeological Evaluations for PRB Siting



Deep

# Budget Funding – Previous and Current

## Previous Planning Efforts

- Updates to Needs Assessment and Alternatives Screening Analysis Reports
- Hybrid development – Salt Pond and Town Cove
- CCC 208 Compliance
- Shellfish Feasibility Study
- Groundwater/hydrogeological investigation – PRB siting
- Remediation of Great Pond and Herring Pond

## Current Planning Efforts – FY19 Budget

- Shellfish pilot project development
- PRB pilot planning and design
- Outline TWMP for Nauset Estuary/Eastham
- Coordination with Orleans – shared watershed planning
- Continued coordination with CCNS
- Continued monitoring
- CCC 208 Compliance

**\$200,000**



# Budget Funding – Future

## Future Planning Efforts – FY20 Budget

### **Watershed Management Planning:** **\$200,000**

- Regional coordination with Orleans, CCNS
- Preparation of TWMP for Nauset Estuary/Eastham
  - O&M of TMDL compliance, documented progress of implementation required
  - Develop flow neutral policy – 0% SRF Funding eligible
  - Identification of “core” sewer area – MassDEP requirement
- Development of I/A Systems Pilot(s) – Town Cove
- Final layout and permitting of shellfish pilot project. Continue to evaluate existing shellfish program with Natural Resources, CCNSS and DMF

### **PRB:** **\$450,000**

- Final design, permitting, installation and monitoring of PRB pilot

### **Stormwater:** **\$200,000**

- Preliminary design of stormwater collection system for Schoolhouse/Minister Pond Route 6 outfall. Pursue state funding for construction
- Obtain permits and initiate construction of stormwater system at Park Street designed by Ryder Wilcox

### **Monitoring / Assessment / Remediation:** **\$100,000**

- Long term monitoring, adaptive management
- Freshwater pond monitoring, assessment and remediation







Orleans PRB Pilot, Source: Cape Cod Times

[www.ghd.com](http://www.ghd.com)